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Peer Review Report

Peer review report 2 On "COMPARISON OF DOWNSCALING METHODS FOR MEAN AND EXTREME PRECIPITATION IN SENEGAL"

Original Submission

1.1. Recommendation

Minor Revision

Comments to Author:

In most cases climate change projections from General Circulation Models (GCM) and Regional Climate Models (RCM) cannot be directly applied to climate change impact studies, and downscaling is therefore needed. This paper compares two different downscaling techniques (the Quantile-Quantile transformation and Delta-change method) using results from four different RCMs at six stations in Senegal (period 2000-2050). Special focus is given to the changes of mean and extreme events since downscaling methods mainly differ in the way mean and extreme events are generated.

In general, the paper is well written, the different sections are clear and well supported. However, I invite authors to consider the following comments prior to acceptation for publication.

General comments

Introduction

* The introduction provides a poor definition of the motivation of the study. It quickly goes into discussion of different statistical downscaling techniques models used for climate change studies. However, to make the introduction more substantial, the authors must provide several references for each statistical downscaling methods. Moreover, the authors must discuss about the basic idea in statistical downscaling, downscaling approaches (statistical and dynamic), the main advantages and drawbacks of statistical downscaling. I recommend strengthening and clarifying the introduction

Methodology

* In the process of applying the delta change method and the quantile-quantile (QQ) transformations, the authors should also briefly explain choice criteria of these methods.

* I suggest to the authors to provide more information about the two techniques (quantile-quantile (QQ) and delta change method), while explaining their advantages and limitations. Also, the authors should mention how delta-change method was used in order to not only takes changes in the mean into account but also the changes in the extremes.

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2214-5818/$ – see front matter
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Specific comments

Abstract

* Page 2; lines 30-33: In this paragraph, you mention that the aim of the paper is about climate change detection, while the title of this paper is about comparison of two downscaling methods for mean and extreme precipitation Senegal. The connection between change detection and comparison could be clearer.

* Page 1, 2 line 25 & 28: abbreviations should be defined upon first use in the text, example: RCM (Regional Climate Model), GEV (Generalized Extreme Value).

Introduction

* Lines 70-73: I don't understand why you mention illustration of a spatial downscaling procedure referred to as bias-correction spatial disaggregation in this study.

Results and discussion

* Figure 3: It seems to me that Figure 3 is not clear, I would suggest removing it and replace it by cumulative distribution plot of the selected model and the rainfall occurrence for the station Dakar.

* Table 4-7: to illustrate more the projected changes in extremes precipitations after statistical downscaling, and the mean precipitation (main part of results), I suggest to the authors to use boxplots associated to each table (tables 4-7).

Anonymous
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